



**POLLUTION PREVENTION AND CONTROL ACT 1999
ENVIRONMENTAL PERMITTING (ENGLAND AND WALES) REGULATIONS
2016, as amended**

Permit Number: 2.2/065825/JT5

Installation Address:

Atomising Systems Limited

371 Coleford Road

Sheffield

S9 5NF

In accordance with the Environmental Permitting (England and Wales) Regulations 2016, as amended, Atomising Systems Limited is hereby permitted to operate a scheduled activity at the address detailed above, namely the producing, melting or refining iron or steel or ferrous alloys using electric induction furnaces as described in Schedule 1, Part 2, Chapter 2, Section 2.1, Part B subsection (b) ii); and the melting or making of non-ferrous metals in plant with a melting capacity of less than 20 tonnes per day as described in Schedule 1, Part 2, Chapter 2, Section 2.2, Part B, subsection (a) and subject to the following Permit conditions.

Signed _____ Dated this day: 7th November 2024

Commercial Team Manager

Authorised by Sheffield City Council to sign on their behalf

The Secretary of States Process Guidance Notes PG2/3 Statutory Guidance for Electrical Furnaces, PG2/4 Iron, Steel and Non-Ferrous Foundry Processes, PG2/7 Copper and Copper Alloy Installations, and PG6/35 Metal Powder and Other Thermal Metal Spraying Processes, have provided the framework for the conditions in this permit.

Name & Address of Operator:

Atomising Systems Limited
371 Coleford Road
Sheffield
S9 5NF

Contact: Eric Campbell Tel: (0114) 262 6208 Mob: 07966 372660

Email: efc@atomising.co.uk

Company Registration Number: 2731401

Registered Office:

Atomising Systems Limited
371 Coleford Road
Darnall
Sheffield
S9 5NF

Address of Permitted Installation:

Atomising Systems Limited
371 Coleford Road
Sheffield
S9 5NF

Holding Company:

No holding company

Talking to Us

Any communication with Sheffield City Council should be made to the following address quoting the Permit Number: 2.2/065825/JT5

Environmental Protection Service
4th Floor Howden House
1 Union Street
Sheffield
S1 2SH

Tel: 0114 273 4651

Alternatively Email: epsadmin@sheffield.gov.uk

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Explanatory Note to Pollution Prevention and Control Permit for Part B Installations.

(This note does not form a part of the Permit)

The following Permit is issued under the Environmental Permitting (England and Wales) Regulations 2016, as amended (“the EP Regulations”) to operate an installation carrying out activities covered by the description in Schedule 1, Part 2, Chapter 2, Section 2.1, Part B subsection (b) ii);

CHAPTER 2 Production and processing of metals, SECTION 2.1: *Ferrous metals*

Part B

(b)Unless falling within Part A(2)(a) or (d) of this Section, producing, melting or refining iron or steel or any ferrous alloy (other than producing pig iron or steel, including continuous casting) using—

(ii)a cupola, crucible, reverberatory, rotary, induction, vacuum, electro-slag or resistance furnace.

and CHAPTER 2 Section 2.2, Part B, subsection (a) of those Regulations;

SECTION 2.2 *Non-ferrous metals*

Part B

(a)Melting, including making alloys of, non-ferrous metals (other than tin or any alloy which in molten form contains 50 per cent or more by weight of tin), including recovered products (such as refining or foundry casting) in plant with a melting capacity of 4 tonnes or less per day for lead or cadmium or 20 tonnes or less per day for all other metals.

Process Changes

Under the provisions of the EP Regulations, you are required to notify the Council of any proposed change in operation at least 14 days before making the change. This must be in writing and must contain a full description of the proposed change in operation and the likely consequences. Failure to do so is an offence.

If you consider that a proposed change could result in the breach of the existing permit conditions or is likely to require the variation of permit conditions then you may apply in writing under Regulation 20(1) of the EP Regulations. Additionally, if this involves a SUBSTANTIAL CHANGE to the installation you will be required to submit an application, pay the relevant fee and advertise the application accordingly. You may serve a Notice on the Council requesting that they determine whether any change that is proposed would constitute a substantial change before you proceed with application.

Variations to the Permit

The Permit may be varied in the future by the Council serving a Variation Notice on the Operator. If the Operator wishes any of the Conditions of the Permit to be changed, a formal Application must be submitted.

Surrender of the Permit

Where the operator of a Part B installation or mobile plant ceases or intends to cease the operation of the activity the operator may notify the regulator of the surrender of the whole permit, in any other case, notify the regulator of the surrender of the permit in so far as it authorises the operation of the installation or mobile plant which he/she has ceased or intends to cease operating. The notification shall contain information as described in Regulation 24 or 25 of the EP Regulations.

Transfer of the Permit or Part of the Permit

Before the Permit can be wholly or partially transferred to another person, a joint application to transfer the Permit has to be made by both the existing and proposed holders, in accordance with Regulation 21 of the EP Regulations. A transfer will be allowed unless Sheffield City Council considers that the proposed holder will not be the person who will have control over the operation of the installation or will not ensure compliance with the conditions of the transferred Permit.

Annual Subsistence Fee

In accordance with Regulation 66 of the EP Regulations, the holder of a permit is required to pay a fee for the subsistence of the Permit. This fee is payable annually on 1st April. You are advised that under the provisions of Regulation 66 (5) of the EP Regulations, if you fail to pay the fee due promptly, Sheffield City Council may revoke the Permit. You will be contacted separately each year in respect to this payment.

Public Register

The Council is required by Regulation 46 of the EP Regulations to maintain a Public Register containing information on all LAPPC installations and mobile plant. The register is available for inspection by the public free of charge during office hours (Monday to Friday 9.00 am to 5.00 pm) at the following address:

Sheffield City Council
Environmental Protection Service
4th Floor Howden House
1 Union Street
Sheffield
S1 2SH

Tel: 0114 273 4651 Alternatively Email: epsadmin@sheffield.gov.uk

Confidentiality

Sheffield City Council has a duty to consider the question of confidentiality of information supplied to it. If any information supplied is considered confidential, a statement of which information this applies to and the reasons why it is considered confidential should be specified. The Operator is reminded that he may apply to Sheffield City Council for the exclusion of information from the public register under the provisions of the Environmental Permitting (England and Wales) Regulations 2016 as amended.

Appeals

Under Regulation 31 of the EP Regulations operators have the right of appeal against the conditions attached to their permit. Schedule 6 of the EP Regulations sets out the detailed procedures.

Appeals against a Variation Notice do not have the effect of suspending the operation of the Notice. Appeals do not have the effect of suspending Permit conditions.

Notice of appeal against the conditions attached to the permit must be given within six months of the date of the Notice, which is the subject matter of the appeal.

How to Appeal

There are forms available to lodge an appeal here:

[Environmental permit: appeal form - GOV.UK \(www.gov.uk\)](http://www.gov.uk/government/forms/environmental-permitting-appeal-form)

There is no fee to appeal.

Where to Send Your Appeal Documents

Appeals should be addressed to:

The Planning Inspectorate
Environment Appeals Team
3A Eagle Wing
Temple Quay House
2 The Square
Temple Quay
Bristol BS1 6PN

Phone: 0303 444 5584

Email: etc@planninginspectorate.gov.uk

You must also send a copy of your appeal to the relevant regulator.

In the course of an Appeal process, the main parties will be informed of the procedural steps by the Planning Inspectorate.

To withdraw an Appeal the Appellant must notify the Planning Inspectorate, in writing, and copy the notification to the local authority.

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Notice of appeal against the conditions attached to the permit must be given within six months of the date of the Notice, which is the subject matter of the appeal.

To withdraw an appeal the appellant must notify the Planning Inspectorate in writing and copy the notification to the local authority.

Definitions

In relation to this Permit, the following expressions shall have the following meanings:

“Application” means the application for this Permit, together with any response to a notice served under Schedule 4 to the EPR Regulations and any operational change agreed under the conditions of this Permit.

“EPR Regulations” means the Environmental Permitting (England and Wales) Regulations 2016 and words and expressions defined in the EPR Regulations shall have the same meanings when used in this Permit save to the extent they are explicitly defined in this Permit.

“Permitted Installation” means the activities and the limits to those activities described in this Permit.

“Monitoring” includes the taking and analysis of samples, instrumental measurements (periodic and continual), calibrations, examinations, tests and surveys.

“Regulator” means any officer of Sheffield City Council who is authorised under section 108(1) of the Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in Section 108(1) of that Act.

“BAT” means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing in principle the bases for emission limit values designed to prevent, and where that is not practical, generally to reduce emissions and the impact on the environment as a whole. For those purposes:

“available techniques” means those techniques which have been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the cost and advantages, whether or not the techniques are used or produced inside the United Kingdom, as long as they are reasonably accessible to the Operator;

“best” means, in relation to techniques, the most effective in achieving a high general level of protection of the environment as a whole; *“techniques”* include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned. Schedule 2 of the Regulations shall have effect in relation to the determination of best available techniques, and;

“Fugitive Emission” means an emission to air from the Permitted installation that is not controlled by an emission limit imposed by a condition of this Permit.

Where any condition of this Permit refers to the whole or parts of different documents, in the event of any conflict between the wording of such documents, the document with the most recent publication date shall be taken to be the most appropriate document to be used.

Description of Activities

Introduction

Atomisation is a process used to produce powders of metal alloys with specific controlled properties with respect to shape, size and consistency. The metal powders are used in many industries and emerging applications and markets. These range from solder and brazing pastes to Metal Injection Moulding and other near net shape manufacturing techniques, catalytic converters and also nanotechnology.

Atomising Systems Limited has manufacturing plants, research and development and laboratory facilities at the Coleford Road premises. The company produces a range of metal alloy powders using atomisation techniques as well as performing research into new methods, better technology and process improvements.

The company produces both ferrous and non ferrous based alloys. The main alloys produced on site are steel and copper alloys. Other alloys include nickel and precious metal alloys. A list of the main alloys produced is included in the table below – Alloys Produced in 2021.

Alloys Melted in 2021

ALLOY	TYPE	ALLOY	TYPE	ALLOY	TYPE
1.3912	Ferrous	C260E	Non-ferrous	S500	Ferrous
1.3964	Ferrous	Cobalt	Non-ferrous	S7	Ferrous
1.4410	Ferrous	Copper	Non-ferrous	SP1130	Ferrous
1.4462	Ferrous	CPM1V	Ferrous	T10	Ferrous
1.4463	Ferrous	CuMnNi	Non-ferrous		
1.4828	Ferrous	CuNi25	Non-ferrous		
1.4901	Ferrous	CuNiSiCr	Non-ferrous		
1.7131	Ferrous	CuP8	Non-ferrous		
15-5PH	Ferrous	Fe2.5Cr1.5Mo1Si1V	Ferrous		
17-4MA 3.0	Ferrous	FeCr40Si11C3.5	Ferrous		
17-4PH	Ferrous	FeCr50	Ferrous		
20MNCr5	Ferrous	FeCrAl	Ferrous		
304B	Ferrous	FeCrSi	Ferrous		
304L	Ferrous	FeMn10Si3	Ferrous		
310B	Ferrous	FeMn36C4	Ferrous		
310L	Ferrous	FeMn40Cr10Si12C1.5	Ferrous		

310N	Ferrous	FeMn40Si9C1.5	Ferrous
316B	Ferrous	FeNi42	Ferrous
316H	Ferrous	FeSi15	Ferrous
316L	Ferrous	FeSi3	Ferrous
316L + BORON	Ferrous	FeSi7	Ferrous
316L 3.0MA	Ferrous	FSLA	Ferrous
409L	Ferrous	H10	Ferrous
410L	Ferrous	H13	Ferrous
420SS	Ferrous	H13 mod	Ferrous
420W	Ferrous	Hastelloy B	Non-ferrous
42CRMO4	Ferrous	Hastelloy C22	Non-ferrous
430 MOD	Ferrous	Hastelloy C276	Non-ferrous
430L	Ferrous	Hastelloy X	Non-ferrous
430SS	Ferrous	HDA-101	Ferrous
431SS	Ferrous	HK-30	Ferrous
4340	Ferrous	Inconel 600	Non-ferrous
434L	Ferrous	Inconel 600B	Non-ferrous
440C	Ferrous	Inconel 625	Non-ferrous
5048N	Ferrous	M2	Ferrous
8620	Ferrous	Monel 400	Non-ferrous
904L	Ferrous	Ni102	Non-ferrous
AC332E	Ferrous	Ni107	Non-ferrous
AC333E	Ferrous	Nickel	Non-ferrous
AC336E	Ferrous	NiCr20	Non-ferrous
AG72CU28	Non-ferrous	NiCrCuPSi	Non-ferrous
ALLOY 74	Ferrous	NiCuCoFeMn	Non-ferrous

ANCORWEAR	Ferrous	Nitronic 50	Ferrous
BROSE A	Ferrous	P270	Ferrous
BROSE B	Ferrous	Panacea	Ferrous
C242E	Non-ferrous	PL26 mod	Ferrous

The process operates four main production atomisers;

- Two gas atomisers using nitrogen, namely the Big Gas Atomiser (200kg capacity) and the Supreme Atomiser (duplex furnaces 400kg & 500kg capacity) used mainly for the production of non-ferrous and ferrous alloys: copper alloys (30%), ferrous stainless steel alloys (60%) and nickel based alloys (10%). Fumes from the furnaces are extracted via lip extraction and passed through a (DCE Tornado 10MKII) cartridge filter before exhausting to air via ASL1. The emissions from the nitrogen atomising process are filtered through a Dustcheck SFJ16-1.6-10 FS cartridge filter before being vented to external atmosphere via stack ASL2.
- Two water atomisers, namely the UHP (750kg capacity) and the D25/D75 (750kg capacity) used mainly to produce ferrous stainless steel powders. The emissions from the furnaces serving the atomisers are lip extracted and filtered through a DCE Tornado 8 Xcell cartridge filter before being vented to external atmosphere via stack ASL4.
- In addition to the above, there is one other small atomiser (30kg capacity). The F5/D5/H which is flexible and can be configured to atomise using either gas or water. The main alloys produced in this atomiser are silver based. The emissions from the F5/D5/H are filtered through a DCE Tornado 3 filter prior to discharging to the air via ASL6.

The installation has a melting capacity which does not exceed 20 tonnes per day for non-ferrous and a production capacity of less than 20 tonnes per day of ferrous metals.

The company produced <2067 tonnes of powder in 2023 (<6,000kg per day) in total. This is expected to grow in future with the new changes but not to exceed 10,000kg per day of ferrous and non-ferrous combined.

Production Processes

The main melting and casting processes on site for atomising that have dedicated furnaces are:

1. Big gas atomiser (200kg)
2. Supreme gas atomiser (Duplex furnaces of 400kg and 500kg)
3. UHP Water atomiser (750kg)
4. D25/D75 Water atomiser (750kg)

5. Flexible R&D plant (F5/D5/H) may be configured to gas or water atomising (30kg)

Schematic diagrams of each of the larger processes are included in Schedules 4, 5, 6, and 7. The processes are batch operations with process constraint and limitations on the cycle/tact time. Material is induction heated in the crucible for each pour and poured through a Tundish orifice before being mechanically atomised in a fluid stream.

Gas Atomisation

Raw materials

The raw materials for the process include:

- Metals and other elements – these are generally in ingot, slab, chip or powder form.
- Nitrogen and argon. The company has installed and operates a state-of-the-art nitrogen gas recovery and recycling system, which filters (in a cyclone classifier and filtration system) and cools and pressurises oxygen free nitrogen to 30Bar to allow the exhaust nitrogen stream to be recycled vastly cutting the quantity of virgin liquid nitrogen used on site.
- Recycled Powders – oversized powder from previous melts.
- Slag Coagulant Granules – a non-fuming slag coagulant (Slax 20) is used to prevent slag from the crucible entering the atomisation stage.

Melting

Melting capacity is limited by furnace capacity and by order book and product mix, process constraints and resources (power, shared resources e.g. extraction, and planned maintenance). All, except furnace capacity, determine how often metal is poured.

The raw metals for each melt are weighed and placed in a charge skip for transport to the melting platform. The induction furnace is fitted with a refractory lined crucible, and this is situated on a raised platform above the atomiser. The maximum weight for each melt is variable depending on the process. In each case, this is limited by the induction furnace capacity stated. The maximum number of melting and pouring cycles is set by constraints of each process. No fluxes are added to the raw materials.

A Supreme furnace charge typically takes 60 minutes to melt and reach pouring temperature and for the alloy to be thoroughly mixed. The new duplex facility allows a second charge to be prepared in parallel to an existing pour. This has the impact of elevating the production capacity by addressing a capacity limitation. The duplex furnaces are to be mounted on a hydraulic platform which uses a non-flammable hydraulic fluid. The duty and standby furnaces can be manoeuvred into position to pour from opposite sides of the tundish.

After melting the product is poured and atomised. The time to pour is variable depending on the process requirements, but it is typically up to 50 minutes. The pouring times are dependent on the furnace used and rate determining constraints. The exact time varies depending on charge weight, alloy composition, material physical form and the power settings of the furnace. The tap-to-tap times were typically 2 hours on the largest plants and for the duplex furnaces it is estimated that

this may be reduced to 1.5 hours. Other production benefits are that fritting linings can be done without consequential loss of production. The tap-to-tap limit, constrains the daily melting capacity. Observed cycle times are limited by physics and resource availability (including shared equipment, resources and power).

During heating there is some loss of metal. This is mainly through the formation of slag. Approximately 0.55% of metal is lost by combination into slag. Emissions from the furnaces are removed via lip extraction before being filtered and exhausted to atmosphere to emission point sources ASL1 (gas atomiser furnaces) and ASL4 (water atomiser furnaces). ASL2 is the nitrogen exhaust from the gas atomisers. The filter serving emission point ASL1 is fitted with a pressure drop indicator and ASL4 has a continuous emissions monitor DB1 and datalogger.

The table below describes the plant, abatement and stack heights;

Process	Furnace	Capacity	Stack Height	Abatement	Emission Point
Big gas atomiser	F3	200kg	8m	Cellulose Nano cartridge filter and pressure drop indicator	ASL1
Supreme gas atomiser	F4, F5	400kg, 500kg	8m	Cellulose Nano Cartridge filter and pressure drop indicator	ASL1
Nitrogen exhaust from gas atomisers	F3, F4 & F5	200 & 400kg	10m	RD72 threaded PES A/S PTFE membrane Cartridge filter and pressure drop indicator	ASL2
Classifier	n/a sieving process	n/a	8m	R&B Filter, Polyester non-woven with PTFE coating Cartridge filter and pressure drop indicator	ASL3
UHP Atomiser (water)	F1	750kg	10m	XL Z500 Polyester FD bag filter shared with F2 with DB1 CEM particulate monitor	ASL4
Packing Station	n/a abatement for transfer of materials	n/a	10m	Cartridge Nanoweb filter media with reverse jet and pressure drop indicator	ASL5

Flexible R&D Atomiser	F5/D5/H	30kg	10m	Cartridge Nanoweb filter media with reverse jet and pressure drop indicator	ASL6
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As soon as the melt is at the target temperature and homogenised, it is poured by tipping the furnace into a heated Tundish. The molten alloy falls under gravity into the atomiser. Here it meets a carefully controlled stream of fluid (nitrogen gas or pressurised water typically) and is formed into the metal powder. Alternative techniques such as atomisation through mechanical spinning may be used, a mechanical atomising technique known as centrifugal atomising, are feasible techniques to shear and atomise the molten alloy stream. There are no fixed plants that use centrifugal atomising at the time of issue, however, the company may use this as part of R&D projects from time to time.

The powder then passes into a cyclone or water collection system. The gas atomising cyclone captures the metal particles above approximately 5µm in diameter. Smaller gas atomised particles are carried in the stream of nitrogen gas or steam, then pass through 4 Filstar cyclones to remove ultra-fine powders which fall into collection pots and any remaining particles are filtered through to the abatement plant before being expelled to the external air.

The water atomisers wash larger particles (pings) off the atomising chamber walls which are millimetres wide, these fall through a trash screen and are collected in a receptacle.

The gas atomisation process tap times for the 200kg furnace is 2 hours tap time and 2 (possibly reducing to 1.5) hours for the 400 & 500kg furnaces, depending on the material and process parameters.

The whole process for gas or water atomising to the filtration plant is a sealed system. Molten metal and nitrogen gas enter at one end and nitrogen gas is exhausted at the stack. The metal powder is collected in a sealed receptacle.

Filtration

Particles of less than approximately 5µm pass through the cyclone then into the Dustcheck SKFJC 20-1.6-10 cartridge filter (ASL2).

The back pressure in the system is continuously monitored so that any rupture of the filter panel will show immediately, and the filter panel can be replaced. This also gives the operator an indication of when the filter requires cleaning. Approximately 0.05% of the raw metal is collected by the dust filter.

Nitrogen Exhaust and Recycling

After passing through the filter the nitrogen gas and any suspended particles of metal pass through the wall of the plant and into a nitrogen gas recovery system. The company is installing a state-of-the-art nitrogen gas recovery and recycling system, which filters (in a cyclone classifier and filtration system), cools and pressurises oxygen free nitrogen to 30Bar to allow the exhaust nitrogen stream to be recycled. This will vastly reduce the quantity of virgin liquid nitrogen used on site. The recycled stream will be blended with make-up nitrogen as necessary and sent around the plant. This stream will be continuously filtered and only vented to

atmosphere where excess oxygen is required to be purged. The vent stack ASL2 terminates above the roof level of the building at a height of 10m above the ground.

Sieving and Despatch

Once the atomisation of the batch is complete the powder collected in the receptacle is taken from the base of the cyclone and transferred to a sieve. Here oversize particles are separated from the finished product to be returned to the melting furnace.

At points where powder transport containers are connected and disconnected there is potential for small amounts of powder dust to escape. This dust is controlled by local exhaust ventilation (LEV) points at appropriate places. All such LEV systems are filtered and exhausted internally as fugitive emissions.

The finished powder passes through the sieve and is collected in barrels ready for despatch to the customer. In most cases powders are stored inside a sealed plastic bag inside the barrel. This protects the powder from the atmosphere and gives a secondary containment should the barrel be dropped and break open.

Water Atomisation

High and Ultrahigh Pressure Water Atomiser

The high pressure (D25/D75) and Ultrahigh (UHP) pressure water atomisers have 2 x 750Kg Atomising Systems Limited bespoke electric induction furnaces to produce powders of stainless steels and other ferrous alloys. The atomiser uses high pressure water in a closed system to produce the powder so there are no emissions to air from the atomisation process other than from the furnace.

After atomising the powders are dried, blended and then sieved for delivery to the customers.

Water atomisation is represented schematically in Schedules 5 and 7 of this permit.

Raw Materials

The raw materials for the process are:-

- Metals – these are generally in ingot, slab or powder form.
- Recycled Powders – oversized powder from previous melts.
- Slag Coagulant Granules – a non-fuming slag coagulant (Slax 20) is used to prevent slag from the crucible entering the atomisation stage.

Melting

The raw metals for each melt are weighed and placed in a refractory crucible in the induction furnace. The induction furnace is situated on a raised platform above the atomiser.

No fluxes are added to the raw materials.

Melts are expected to take 30-60 minutes to reach pouring temperature and for the alloy to be thoroughly mixed.

While heating a charge there are emissions from the furnace. As no fluxes are used these will mostly be in the form of metal oxide particulates including iron, nickel, chromium, manganese and molybdenum.

The emissions from the furnace are collected in a hood and drawn through vents and extracted through a Tornado 8 Xcell cartridge filter) which exhausts through a stack

ASL4 (amended to see Schedules 5 and 7) at a height of 10.0 metres (through the roof) from ground level. ASL4 is fitted with a DB1 continuous particulate emissions monitor and data logger which is set to alarm at a control limit of 15mg/m³ (against an emission limit of 20mg/m³).

As soon as the metals are mixed, and at an appropriate temperature, the molten alloy is poured by tipping the furnace.

Atomisation and Drying

The molten alloy is poured directly from the crucible and falls under gravity into the atomiser. Here it meets a carefully controlled stream of water and is formed into the metal powder. Larger particles (pings) pass through a trash screen and are collected in a receptacle

There are no emissions to air from the atomiser. The wet powder and water then pass into a centrifuge where the water is extracted for recycling. The powder passes into double-cone vacuum driers for drying.

General Powder Handling

During normal production emission of powders is controlled by using local exhaust ventilation (LEV) at all points where emissions are likely. These LEV points are extracted through a filtration system and exhausted internally as fugitive emissions. This has been found to give adequate control at the current site.

In the case of spillage, and during some maintenance procedures, a vacuum cleaner with an appropriate filter is used to collect the powder and minimise dust.

Annealing

Atomising Systems Limited also operates a directly associated process of annealing. Not all powders are annealed. The unit is a bespoke, all electric, powder annealing process: this is a batched sealed process operated in an inert (argon) or reducing (Ar/H₂) atmosphere. The annealing operation is undertaken to soften work hardened powders by heating to an elevated temperature and cooling under controlled conditions to provide a softer metal structure. The material is loaded and is heated as it moved through the machine in an Archimedes screw to a receiving hopper. There are no emissions.

Research and Development

Atomising Systems Limited is an R&D led organisation and part of its work is developing new, better and best practices in the field of atomisation where its technical expertise is required to meet customer demand. The company engages in the design, construction, testing and commissioning of atomising plants and operating techniques including modifications and trials to existing plants as part of a continuous development & improvement process. Some of the improvements will become incorporated in designs permanently, some will be discontinued or discarded. The company will keep records of its trial and R&D work in a timeline for inspection by the authority and if these are proposed to become permanent, details of the proposed changes will be notified to the local authority prior to being introduced on site, in accordance with permit conditions.

Permit Conditions.

All conditions are required to be complied with immediately unless otherwise stated.

1. Upgrading Requirements

- 1.1. There are no upgrading requirements.

2. Plant and Equipment

- 2.1. The activities shall be carried out at the location shown in Schedule 1 and within the boundary shown in red as indicated on the Site and Installation Boundary Plan shown in Schedule 2 of this Permit.
- 2.2. Permitted activities shall only be carried out using the plant and equipment detailed in the Description of Activities section of this Permit, the Process Schematics in Schedules 3, 4, 5, 6 and 7, and using equipment as detailed in the Critical/Non-Critical Equipment Inventory in Schedules 8 and 9.
- 2.3. Any changes to the raw materials, processes or plant and equipment specified in the Description of Activities section or any Schedule, that may have an impact on emissions to atmosphere, shall be notified in writing to the Regulator at least 14 days prior to such changes being made.
- 2.4. A minimum discharge velocity of 15m/s shall be applicable to all stacks. The discharge shall be vertically upwards.

3. Production and Melting Capacity

- 3.1. The installation shall produce less than 20 tonnes per 24-hour period of ferrous product.
- 3.2. The installation shall have a melting capacity of less than 20 tonnes of non-ferrous metal per 24-hour period.
- 3.3. The Operator shall maintain a record of production to determine compliance with conditions 3.1 and 3.2 of the Permit. The record shall include the melt figures for ferrous and non-ferrous for each day in tonnes. The record shall be kept on site and be available for inspection by the Regulator. It shall be forwarded at least once per year the Regulator. The next record shall be submitted by 14th January 2025.

4. Emissions Limits and Controls

- 4.1. All emissions to air shall be free from persistent visible emissions.
- 4.2. There shall be no offensive odour detectable beyond the installation boundary, as perceived by the Regulator.
- 4.3. The use of odour masking agents is not permitted. Where offensive odour is detected at the installation boundary, counteractants may be used only by agreement in writing with the Regulator.

- 4.4. The following emission concentration limits shall apply to releases from the process at the extraction points ASL1, ASL2 and ASL4 (as identified in the Schedules) and shall not be exceeded:

Substance	Limit
Total particulate matter	20 mg/m ³
Copper and Copper Compounds	5 mg/m ³
Nickel, Cobalt and their Compounds (Total in Combination)	5 mg/m ³
Chromium and its Compounds (Total in Combination)	1 mg/m ³
Tin and its Compounds	5 mg/m ³

- 4.5. In the reporting and keeping of emissions monitoring results, all pollutant concentrations shall be expressed at reference conditions 273k, 101.3kPa. The oxygen and water references shall be that which correspond to the normal operating conditions in the process.
- 4.6. The Operator shall ensure that the temperature of melted alloy is adequately controlled to prevent excessive fuming during pouring.
- 4.7. The addition of fluxes to the melting furnace shall not be permitted.
- 4.8. There shall be no burning of materials, including waste, in the open air, inside buildings or in any form of incinerator in connection with the activities within the installation boundary, without prior permission in writing from the Regulator.

5. Monitoring, Sampling and Measurement of Emissions

- 5.1. The Operator shall undertake periodic monitoring to check compliance with the emissions limits specified in section 4 of this Permit. The frequency of the monitoring shall be at least once in every 12-month period or as otherwise agreed in writing by the Regulator.
- 5.2. Monitoring shall be carried out in accordance with methods described in M1 "Sampling requirements for monitoring stack emissions to air from industrial installations" and Monitoring Stack Emissions: Environmental Permits (formerly part of M2), Monitoring stack emissions: environmental permits - GOV.UK (www.gov.uk) or by another method agreed in writing by the Regulator.
- 5.3. For batch processes, where the production operation is complete within, say, 2 hours, then the extractive sampling should take place over a complete cycle of the activity.
- 5.4. Non-continuous emissions monitoring of particulate matter from the emission points shall be carried out in accordance with the main procedural requirements of BS ISO 12141:2002 or BS EN 13284:Part 1, or by any other method agreed in writing with the Regulator.

- 5.5. Results of non-continuous monitoring shall include details of process conditions at the time of monitoring, monitoring uncertainty and any deviations from the procedural requirements of standard reference methods and any error invoked from such deviations.
- 5.6. The Regulator shall be advised at least 7 days in advance of any periodic stack monitoring exercise. The site-specific monitoring protocols shall be submitted and include the stacks to be tested, pollutants to be monitored, methods to be used and the competencies of the consultants undertaking the testing.
- 5.7. The results of periodic monitoring tests shall be forwarded to the Regulator, within 8 weeks of completion of the testing.
- 5.8. The introduction of dilution air to achieve emission limits is not permitted.
- 5.9. The Operator shall ensure that adequate facilities for sampling are provided on vents or ducts. Sampling points on new plant shall be designed to comply with the British or equivalent standards.
- 5.10. Where the results of any non-continuous monitoring exceed the emission concentration limit, the Operator shall inform the Regulator no later than 10:00 hours the following working day after receipt of the results of the emissions testing.
- 5.11. Where the results of any monitoring demonstrate a breach of, or an approach to, the emission concentration limit, the Operator shall investigate the matter as soon as possible. The investigation shall include the following steps:
- Close down the process or plant responsible for the breach;
 - Identify the cause of the breach;
 - Carry out any necessary works or repairs to ensure compliance with the emission concentration limit;
 - Re-test the plant to demonstrate compliance with the emission concentration limit specified;
 - Submit the emissions monitoring report to the Regulator within 7 days of receipt of the results;
 - Record the details of the investigation and outcomes.

6. Maintenance

- 6.1. An audit of items of plant, equipment and control measures concerned with the control of emissions shall be maintained. The audit shall identify all plant, equipment and control measures that are critical to prevent, reduce or control emissions from the installation, including but not limited to storage tanks, bunding, alarms or warning devices, furnaces, filters, magnehelic/ photohelic gauges, concrete hardstanding and continuous monitors. A copy of the audit shall be made available to the Regulator upon request.
- 6.2. A preventative maintenance schedule shall be employed for all critical plant and equipment concerned with the control of emissions or identified in the audit required by condition 6.1. A copy of the maintenance schedule shall be made available to the Regulator upon request.

- 6.3. For plant and equipment concerned with the control of emissions, or identified in the audit required by condition 6.1, alarms or other warning systems shall be provided to indicate equipment malfunction or breakdown.
- 6.4. The alarms or warning systems required by condition 6.3 for plant and equipment shall be checked as part of a preventative maintenance schedule and maintained in accordance with manufacturer's instructions. A record of such checks and maintenance shall be noted in the recording system kept in accordance with this Permit.
- 6.5. Details of all maintenance, whether planned or unplanned, reactive or preventative, shall be recorded in the logbook or recording system kept in accordance with this Permit.
- 6.6. Any malfunction or breakdown leading to abnormal emissions shall be dealt with promptly and process operations adjusted until normal operations can be restored. All such malfunctions shall be recorded in the logbook kept in accordance with this Permit.
- 6.7. Chimneys, flues and duct work shall be inspected regularly to prevent the accumulation of material internally. Any cleaning or inspection shall be recorded, and details shall be kept on site for a period of at least two years. The details shall be made available to the Regulator upon request.
- 6.8. Spares and consumables subject to continual wear shall be held on site or shall be available at short notice from guaranteed suppliers.
- 6.9. Any emissions to atmosphere outside the normal range of the process when operating under routine operating parameters, such as those caused by any failure, breakdown, malfunction or bypass of arrestment equipment or plant shall be notified to the Regulator at the earliest opportunity and in any event not later than 10.00 am on the next working day. Process operations shall be adjusted as necessary in order to minimise emissions until normal conditions can be restored. Any such occurrence shall be recorded in the logbook kept in accordance with this Permit.
- 6.10. The operator shall report to the Regulator without delay in the event of:
- An emission that is likely to have an effect on the local community; or
 - There is a failure of arrestment plant.
- 6.11. The report to the Regulator shall include:
- The date and time of the incident;
 - The cause and nature of the incident;
 - Details of any abnormal emissions;
 - Details of remedial action taken.
- 6.12. Records of breakdowns and plant failure shall be kept and analysed in order to eliminate common failures. The records shall be made available for inspection by the Regulator on demand.
- 6.13. The Operator shall ensure that all abatement plant is serviced at least once in every 12-month period by a competent person. Details of the maintenance shall be kept on site and made available for inspection by the Regulator on demand.

7. Materials Handling

- 7.1. All potentially dusty materials including raw materials, processed materials or waste materials, shall be stored in covered containers or under cover.
- 7.2. The Operator shall ensure that any spillage of particulate materials is cleaned up immediately by a wet, or vacuum, cleaning method as appropriate to the material.
- 7.3. Spent bag or cartridge filters shall be changed and stored in a manner which minimises fugitive emissions.
- 7.4. Transfers and handling of potentially dusty materials (raw materials, processed materials and waste materials) shall be carried out by methods that minimise the potential of emissions and spillages.
- 7.5. Dusty wastes shall be stored in bags or containers and placed in a covered skip.
- 7.6. Waste skips or receptacles shall be stored covered.

8. Continuous Monitoring

- 8.1. The cartridge filters at emission point ASL1, ASL2 and ASL3 serving the Big Gas and Supreme Gas Atomisers, Nitrogen Exhaust and Classifier respectively shall each be fitted with an alarmed pressure-drop indicator.
- 8.2. The pressure-drop indicators required by condition 8.1 shall monitor the pressure differential and automatically alarm when acceptable parameters are breached, whenever the extraction system it serves is operating.
- 8.3. The pressure-drop indicators required by condition 8.1 shall each be fitted with an audible and visual alarm located in a suitable area to alert operating staff.
- 8.4. Emissions of particulate matter from emission point ASL4 serving the UHP and D25/D75 water atomisers shall be continuously indicatively monitored using a DB1 (or equivalent) monitor.
- 8.5. The indicative particulate monitor at emission point ASL4 shall continuously monitor and record the particulate data whenever the process it serves is operating.
- 8.6. The indicative particulate monitor shall be fitted with a visual display which is clearly legible to operating staff.
- 8.7. The indicative particulate monitor shall be fitted with an audible and visual alarm located in a suitable area to alert operating staff.
- 8.8. The alarms serving the DB1 (or equivalent) continuous particulate monitor on ASL4 shall be set to trigger when the particulate emissions reach a reference level equivalent to 15mg/m³.
- 8.9. Alarm events from the particulate monitor shall be automatically recorded.
- 8.10. Any continuous monitor used shall provide reliable data >95% of the operating time, (i.e. availability >95%). A manual or automatic procedure shall be in place to detect instrument malfunction and to monitor instrument availability.

- 8.11. A reading of the magnehelic/photohelic gauges or other pressure drop indicators serving filters shall be taken and recorded on every operational day. Details of the reading shall be recorded in the logbook or recording system kept in accordance with this Permit. Where the reading falls outside the optimum parameters for the plant, the condition of the filters shall be investigated and rectified. Details of the investigation and outcomes shall be recorded in the logbook or recording system.
- 8.12. The Operator shall ensure that a visual check of the indicative particulate monitor and associated alarms is carried out at least once in every 3-month period for any signs of damage. Any defects shall be repaired as soon as possible. Details of the checks and any repair work shall be recorded in the logbook or recording system required by this Permit.
- 8.13. The Operator shall ensure that the indicative particulate monitor is serviced and calibrated at least once in every 12-month period by a competent person. Details of the servicing or maintenance shall be recorded in the logbook or recording system kept in accordance with condition 9.7 of this Permit.
- 8.14. A 6-monthly summary of automatically recorded data and alarm events from the particulate monitor shall be forwarded to the Regulator twice per year. The next summary is required to be submitted by 14th January 2025.
- 8.15. New or replacement continuous indicative monitors shall be designed for less than 5% down time over any 3-month period. Details of any proposed replacement equipment shall be submitted to the Regulator for written approval prior to installation.

9. General Conditions

- 9.1. Staff at all levels shall receive training, instructions and supervision necessary for their duties and shall include the following:
- responsibilities under the Permit;
 - proper use of equipment;
 - effective preventative maintenance;
 - minimisation of emissions at start-up, and shut down;
 - actions during abnormal emissions including minimisation of emissions.
- 9.2. The Operator shall keep and maintain a statement of training requirements for each operational post and keep a record of the training received by each employee whose actions may have an impact on emissions to atmosphere. These documents shall be made available to the Regulator on request.
- 9.3. Chimneys, flues and ductwork leading to the chimneys shall be adequately insulated to minimise the cooling of waste gases and prevent liquid condensation on internal surfaces.
- 9.4. Chimneys and process vents shall not be fitted with any restriction at the final opening such as a plate, cap or cowl other than a low resistance cowl. A cone fitted to increase the efflux velocity is permitted provided that the discharge is vertically upwards.

- 9.5. External surfaces of the process buildings, ancillary plant and open yards and storage areas shall be kept clean to prevent the accumulation of dusty material in circumstances where dust may become wind entrained. Particular attention shall be paid to roofs, guttering, roadways, external storage areas and yards
- 9.6. The best available techniques shall be used to prevent or, where that is not practicable, reduce emissions from the installation in relation to any aspect of the operation of the installation which is not regulated by any other condition of this Permit.
- 9.7. The Operator shall ensure that a logbook or recording system containing all results of inspections, tests and assessments made in accordance with this Permit is kept. These records shall include the date and time of the inspection or assessment, the nature, colour, persistency and intensity of any emission and the name of the person carrying out the inspection. Adverse results shall be investigated immediately and in all cases be recorded in the log book or recording system. The logbook or recording system shall be kept on the premises available for inspection by the Regulator. Such records shall be kept for a minimum of two years and shall be furnished in writing to the Regulator on demand.
- 9.8. The Operator shall give written notification to the Regulator in the following instances:
- a) Permanent cessation of the operation of any part of, or all of the Permitted Installation;
 - b) Cessation of the operation of any part of, or all of the Permitted Installation for a period, likely to exceed 1 year;
 - c) Any proposed change in the operation of the installation; and
 - d) Resumption of the operation of any part of, or all of the Permitted Installation after a cessation notified under (b) above.
- 9.9. The Operator shall notify the following matters to the Regulator in writing, within 14 days of their occurrence:
- a) Any change in the trading name of Atomising Systems Limited registered name or registered office address;
 - b) A change to any particulars of any ultimate holding company of Atomising Systems Limited, including details of an ultimate holding company where Atomising Systems Limited has become a subsidiary;
 - c) Any steps taken with a view to Atomising Systems Limited going into administration, entering into a company voluntary arrangement or being wound up.

- 9.10. All reports and notifications required by this Permit, or under any Regulation under the Environmental Permitting Regulations 2016, as amended, shall be sent to the Regulator. Unless notified in writing, all reports, notifications and communications in respect of this Permit shall be sent to:

**Sheffield City Council
Environmental Protection Service
4th Floor Howden House
1 Union Street
Sheffield
S1 2SH**

Tel: 0114 273 4651

END OF PERMIT CONDITIONS

Please Note

Where complaint is attributable to the operation of the installation and is, in the opinion of the Local Authority, justified, or if new knowledge develops on the potential for harmful effects from emissions, an immediate review of the Permit shall be undertaken. The Local Authority shall subsequently specify any new requirements and compliance time scales.

An annual subsistence fee as prescribed by the Secretary of State for the Environment shall be payable, for this Permit, by the process Operator, to this Authority within 2 weeks of the 1st April of each year.

In the event that the Permit has been issued after the 1st April in the initial year then the subsistence fee shall be pro rata for the complete months remaining and shall be due within 2 weeks of the Permit issue date.

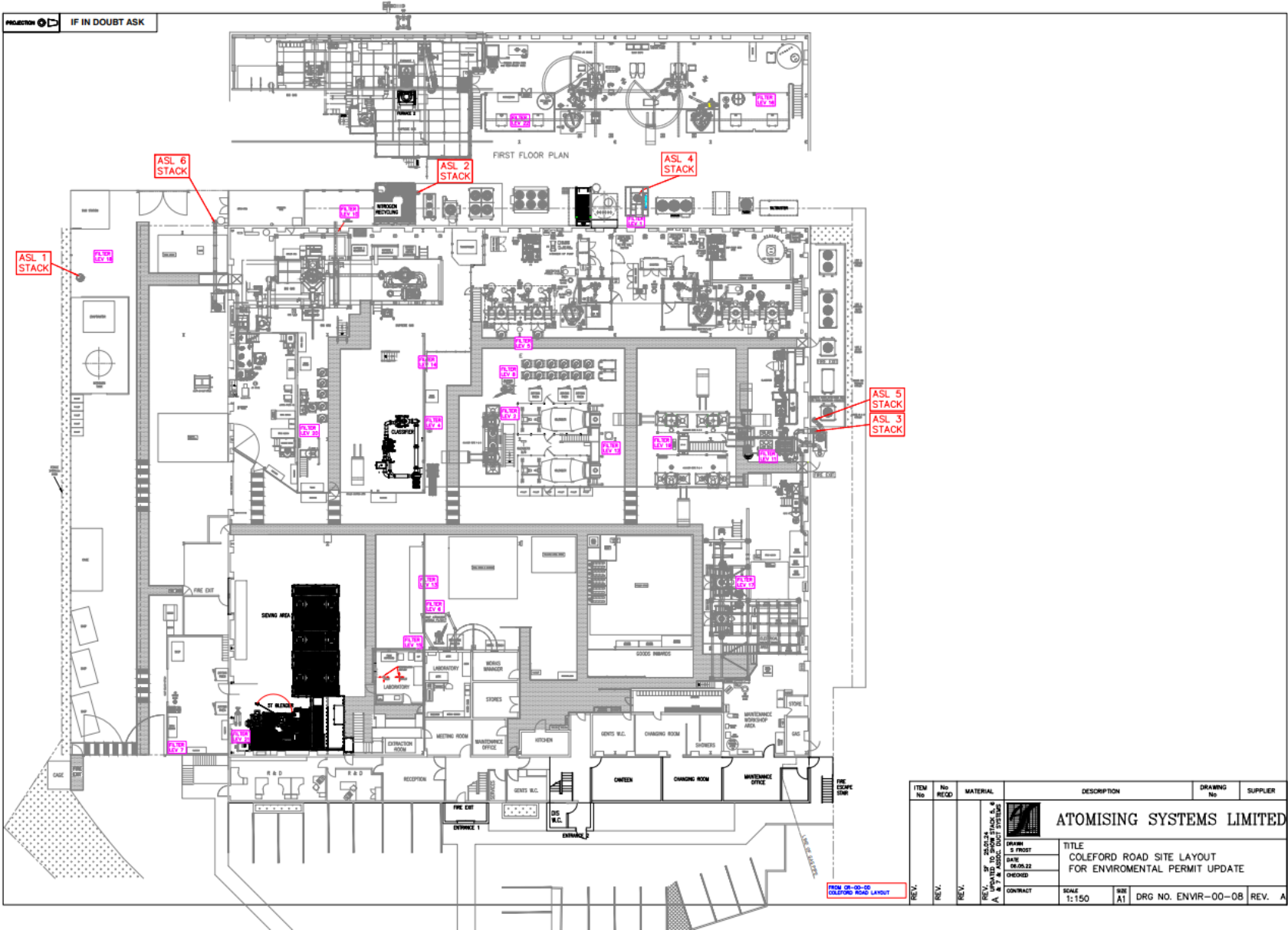
If the relevant payment is not received by Sheffield City Council's Environmental Protection Service then Permit revocation procedures shall be initiated in accordance with Section 22 of the Environmental Permitting (England & Wales) Regulations 2016 as amended or any statutory re-enactment of the same.

The requirements of this Permit are not to be taken as planning permission. Where any structural alterations are necessary to ensure compliance with this Permit then the normal planning channels should be followed.

Schedule 1 Installation Location

Schedule 2 Site and Installation Boundary

Schedule 3 Installation Layout and Emission Points



Schedule 4 Large Gas Atomiser Schematic

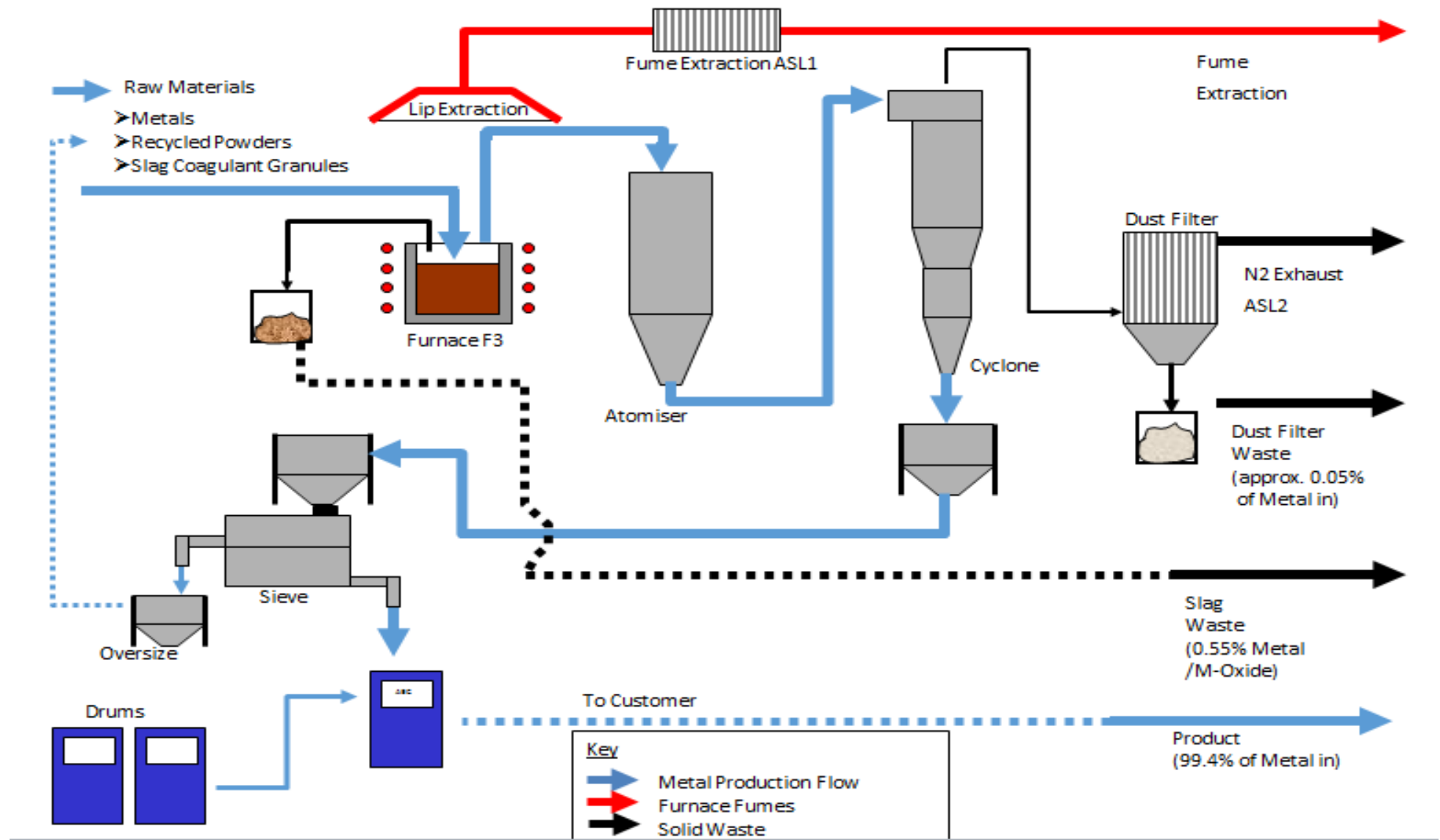
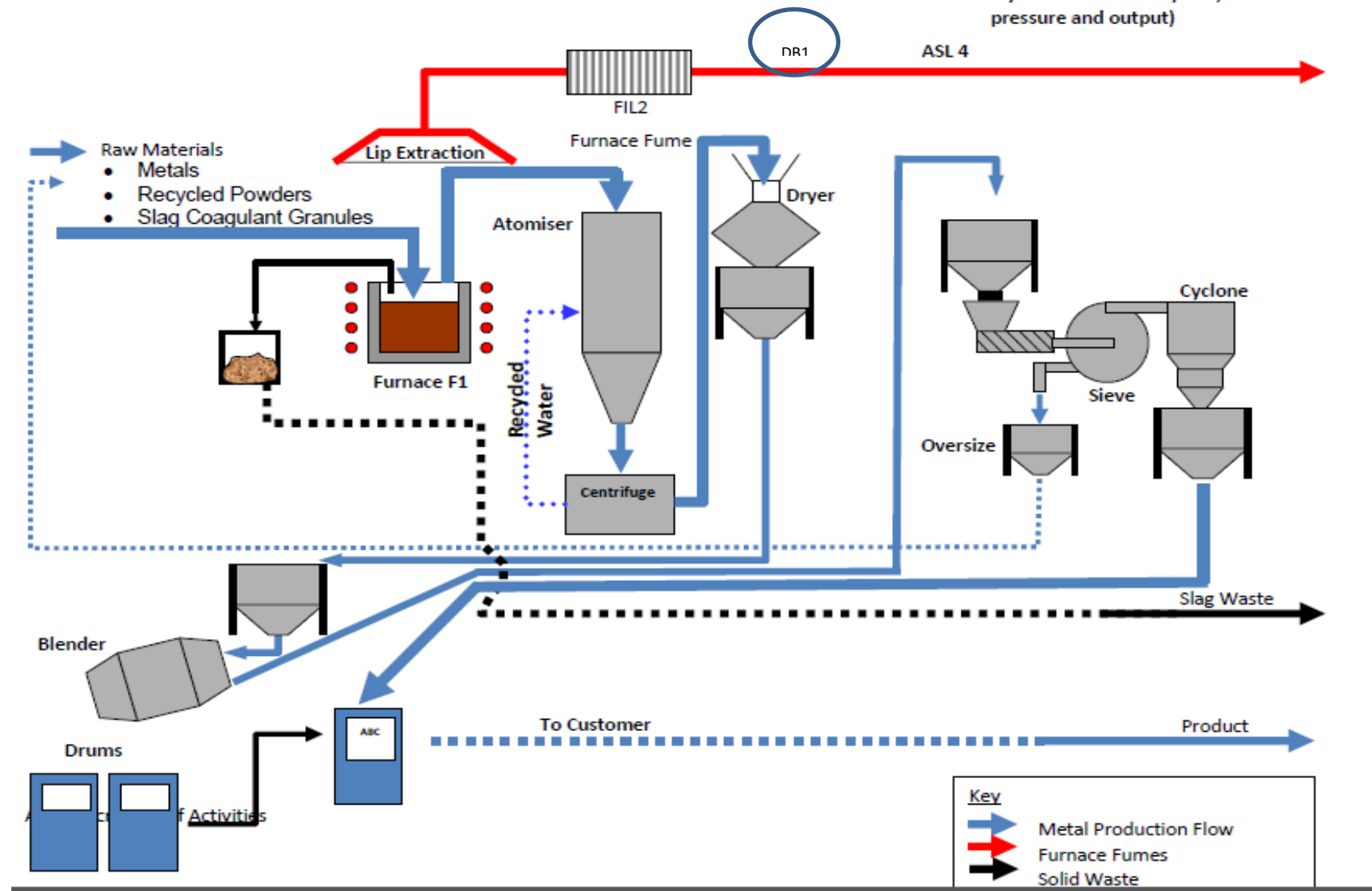
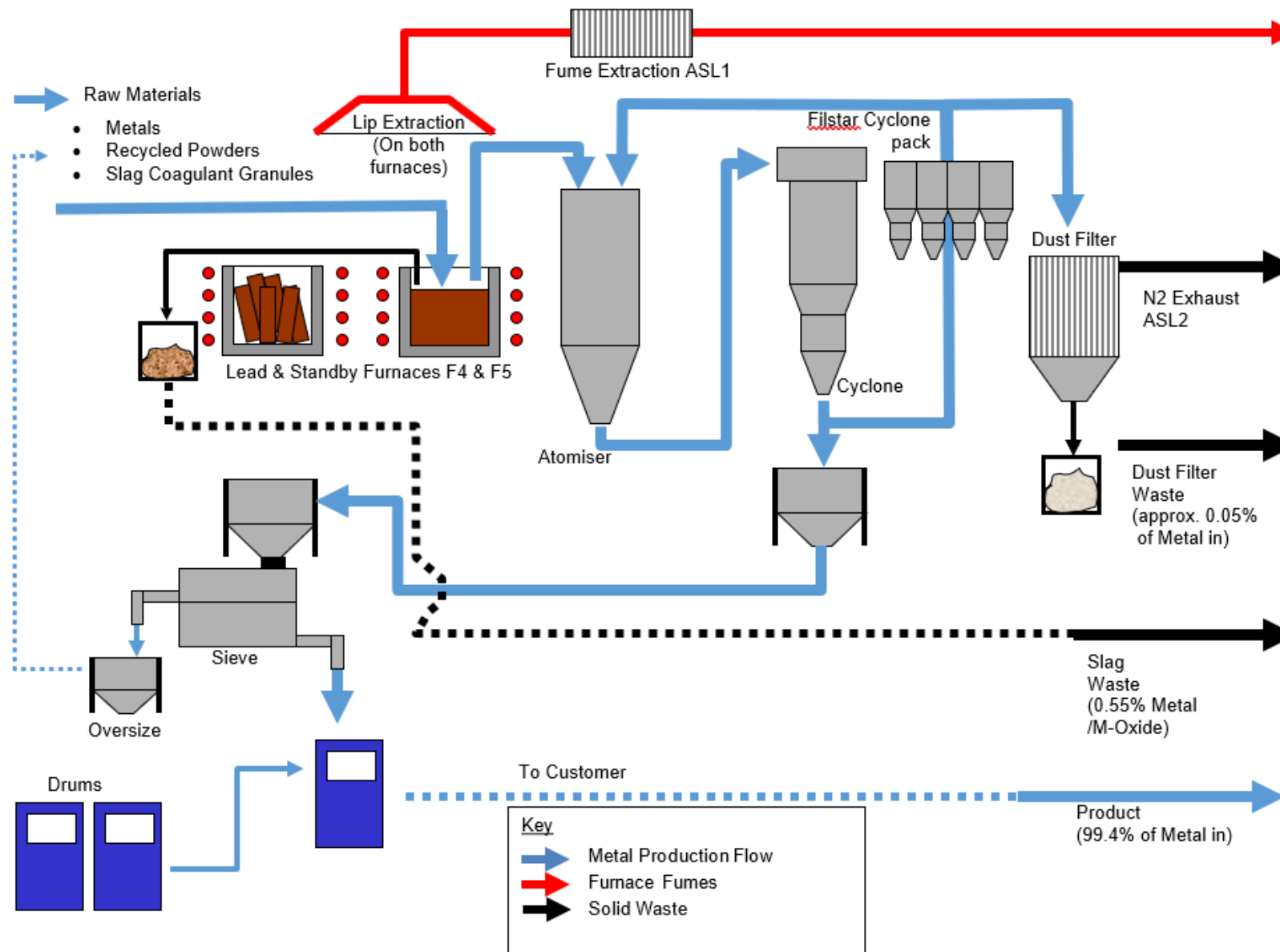


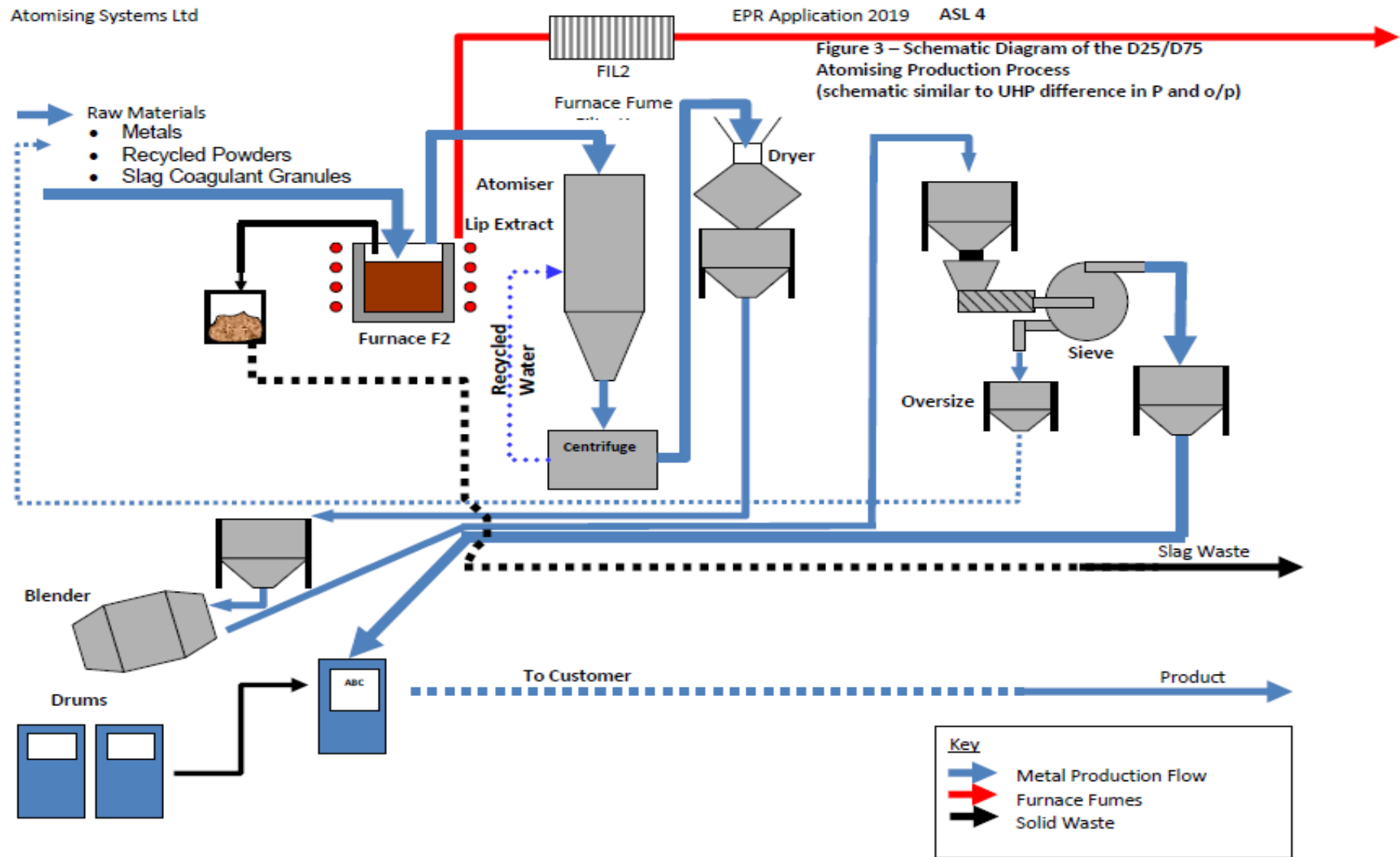
Figure 2 – Schematic Diagram of the UHP Atomising Production Process (Plant layout similar to D25/D75, differences in pressure and output)



Schedule 6 Supreme Schematic (Gas Atomiser)



Schedule 7 Schematic of D25/75 Water Atomiser



A3 - Description of Activities

Schedule 8 Critical Equipment Inventory

The equipment listed below is the critical equipment on site which has an effect on production or abatement of emissions to atmosphere from the site.

Atomisers and Furnaces

Equipment	Make	Model	Serial Number	Site Plan Reference	Notes
Gas/Supreme Atomiser	ASL			ASL 2 LEV 10	Nitrogen gas exhaust emissions go through Dustcheck filter, then through ASL 2 stack – Ref LEV 10 on site plan. Designed and Manufactured by Atomising Systems Ltd.
F5/D5/H Atomiser	ASL			ASL 6 LEV 25	Furnace fume extraction and filtration for F5/D5/H, then vented through stack ASL 6
Water Atomisers 1 & 2	ASL				No emissions from Atomiser. Designed and Manufactured by Atomising Systems Ltd.
Gas/Supreme Atomiser Induction Furnace	TAYLORMADE TAYLORMADE Inductotherm	200 kW/200kg 400kW/400kg 500kW/500kg	388015.090	ASL 1 LEV 18	Fumes extracted through Tornado 10 MKII – Ref LEV18 on site plan.
Water Atomisers 1 & 2 Induction furnace	TAYLORMADE TAYLORMADE	500kW/750kg 500kW/750kg	388015.090	ASL 4 LEV 1	Fumes extracted through reverse jet bag filter DCE Tornado 8 Xcell – Ref LEV 1 on site plan.

Externally Exhausted Extraction and Filtration Systems

Equipment	Make	Model	Serial number	Site Plan Reference	Notes
Gas/Supreme Furnace Extraction and Filtration	DCE	Tornado 10 MKII	1701	ASL1 LEV 18	Furnaces fume extraction and filtration for Gas/Supreme Atomisers LEV 18 then vented through stack ASL 1
Gas/Supreme Atomiser Filtration	Dustcheck	SFJ16-1.6-10 FS	9519	ASL 2/ LEV 10	Filstar Filtration on Nitrogen Exhaust LEV 10 then vented through ASL 2
F5/D5/H Extraction and Filtration	DCE	Typhoon 3	2129	ASL 6 LEV 25	Furnace fume extraction and filtration for F5/D5/H, then vented through stack ASL 6
Classifier Filtration	British Rema	MAC 2	H61876	ASL 3/ LEV 11	Filtration of Classified Powder through LEV 11, then vented through stack ASL 3.
UHP/Water Furnace Extraction and Filtration	DCE	Tornado 8 Xcell With DB1 dust probe	388015.090	ASL 4/ LEV 1	Furnaces fume extraction and filtration for UHP water Atomiser, then vented through stack ASL 4
Water Packing Station	DCE	DCE Typhoon 3	2130	ASL 5 LEV 24	Dust extraction and filtration for Water Packing Station, then through stack ASL 5

Critical Internal Extraction and Filtration Systems

Equipment	Make	Model	Serial number	Site Plan Reference	Notes
Blenders 1&2	Nedermans	Auto M Z15	6008953	LEV 2	This is internally vented – Ref LEV 2 on site plan.
Turboscreen 1 Dust Extraction	DCE	Unimaster/UMA 100		LEV 3	No Serial Number visible. This is internally vented – Ref LEV 3 on site plan.
Packing NAP	Dust Extraction Ltd	DEI 15M	052088701	LEV 4	This is internally vented – Ref LEV 4 on site plan
Gas Powder Classifier					
Mobile Extraction Unit (NAP use)	Nedermans	N24 Mobile Extraction Unit	11395-00 /14510122/383444	LEV 6	Internally vented and used anywhere on shop floor but mainly in NAP section – Ref LEV 6 on site plan
Tundish preparation Room	Nedermans	Filterbox	12600163	LEV 7	This is internally vented – Ref LEV 7 on schematics
Packing Gas	Nedermans	Mobile Extraction Unit	DF 6008953	LEV 8	This is internally vented – Ref LEV 8 on site plan
Finesol Classifier	Turbo Controls	Turbo Dustcheck	6949Y 12	LEV 9	This is internally vented – Ref LEV 9 on site plan
Hopper Decanting Booth & UHP Charge area	Donaldson Torit DCE	UMA253G8	3320604	LEV 13	This is internally vented – Ref LEV 13 on site plan
					LEV 5, 12, 14, 15, 16 & 17 HAVE BEEN MOVED TO NON-CRITICAL

Schedule 9 Non-Critical Equipment Inventory

The equipment listed below is the non-critical equipment on site which has an effect on production or abatement of emissions within the building.

Non-Critical Internal Extraction and Filtration Systems

Equipment	Make	Model	Serial number	Site Plan Reference	Notes
Line 1 Centrifuge platform & Dryers 1&2	Dust control	TLD 30 DC300 stat	14375	LEV 5	This is internally vented – Ref LEV 5 on site plan
Allgaier Sieves 3 & 4	JEC VAC	Cyclone Filter	150343-87377	LEV 12	This is internally vented – Ref LEV 12 on site plan
VIRTO Sieves 1 & 2 + Russell Sieve 2 Big Gas	JEC VAC	Cyclone Filter	150344-87377	LEV 14	This is internally vented – Ref LEV 14 on site plan
Inside & outside of both Labs + UHP Charge area	LAJAC	Cyclone Filter	160291-92516	LEV 15	This is internally vented – Ref LEV 15 on site plan
Line 2 Centrifuge platform & Dryers 3&4	JEC VAC	Cyclone Filter	150345-87377	LEV 16	This is internally vented – Ref LEV 16 on site plan
Line 3 Platform & Dryers 5&6	LAJAC	Cyclone Filter	160563-94959	LEV 17	This is internally vented – Ref LEV 17 on site plan